Document details

IOP Conference Series: Materials Science and Engineering
Volume 342, Issue 1, 6 April 2018, Article number 012017
International Conference on Innovative Technology, Engineering and Sciences 2018, iCITES 2018; Universiti Malaysia Pahang (UMP) Pekan Campus LibraryPekan, Pahang; Malaysia; 1 March 2018 through 2 March 2018; Code 135946

The classification of hunger behaviour of Lates Calcarifer through the integration of image processing technique and k-Nearest Neighbour learning algorithm (Conference Paper) (Open Access)

Taha, Z.[a], Razman, M.A.M.[a], Abdul Ghani, A.S.[a], Abdul Majeed, A.P.P.[a], Musa, R.M.[a], Adnan, F.A.[a], Sallehudin, M.F.[b], Mukai, Y.[b]

[a]Innovative Manufacturing Mechatronics and Sports Lab (IMAMS), Faculty of Manufacturing Engineering, Universiti Malaysia Pahang, Pekan Campus, Pekan, Pahang, Malaysia
[b]Kulliyyah of Science, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Bandar Indera Mahkota, Pahang, Kuantan, Malaysia

Abstract

View references (14)

Fish Hunger behaviour is essential in determining the fish feeding routine, particularly for fish farmers. The inability to provide accurate feeding routines (under-feeding or over-feeding) may lead the death of the fish and consequently inhibits the quantity of the fish produced. Moreover, the excessive food that is not consumed by the fish will be dissolved in the water and accordingly reduce the water quality through the reduction of oxygen quantity. This problem also leads the death of the fish or even spur fish diseases. In the present study, a correlation of Barramundi fish-school behaviour with hunger condition through the hybrid data integration of image processing technique is established. The behaviour is clustered with respect to the position of the school size as well as the school density of the fish before feeding, during feeding and after feeding. The clustered fish behaviour is then classified through k-Nearest Neighbour (k-NN) learning algorithm . Three different variations of the algorithm namely cosine, cubic and weighted are assessed on its ability to classify the aforementioned fish hunger behaviour . It was found from the study that the weighted k-NN variation provides the best classification with an accuracy of 86.5%. Therefore, it could be concluded that the proposed integration technique may assist fish farmers in ascertaining fish feeding routine. © Published under licence by IOP Publishing Ltd.

Indexed keywords

Engineering controlled terms: Agriculture, Data integration, Dissolved oxygen, Feeding, Fish, Image classification, Nearest neighbor search, Water quality

Engineering uncontrolled terms: Fish behaviours, Fish disease, Hybrid datum, Integration of images, Integration techniques, K nearest neighbours (k-NN), K-nearest neighbours, Reduction of oxygen

Engineering main heading: Learning algorithms

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
	Universiti Malaysia Pahang	UMP	

Funding text

This research work is also supported by the University Research Grant titled “Dual Image Fusion Technique for Enhancement of Underwater Image Contrast” (RDU170392), Faculty of Manufacturing Engineering, Universiti Malaysia Pahang.

ISSN: 17578981
Source Type: Conference Proceeding
Original language: English
DOI: 10.1088/1757-899X/342/1/012017
Document Type: Conference Paper
Sponsors: Intel Malaysia,SCANIA Malaysia,Tourism Pahang
Publisher: Institute of Physics Publishing

References (14)

View in search results format ›

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 Cavallari, N., Frigato, E., Vallone, D., Fröhlich, N., Lopez-Olmeda, J.F., Foà, A., Berti, R., (...), Foulkes, N.S.

A blind circadian clock in cavefish reveals that opsins mediate peripheral clock photoreception (Open Access)

(2011) *PLoS Biology*, 9 (9), art. no. e1001142. Cited 99 times.
http://www.plosbiology.org/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1371%2Fjournal.pbio.1001142&representation=PDF
doi: 10.1371/journal.pbio.1001142

View at Publisher

2 Hansen, M.J., Schaerf, T.M., Ward, A.J.W.

The effect of hunger on the exploratory behaviour of shoals of mosquitofish Gambusia holbrooki

(2015) *Behaviour*, 152 (12-13), pp. 1659-1677. Cited 14 times.
http://www.brill.com/behaviour
doi: 10.1163/1568539X-00003298

View at Publisher

3 Beale, A., Guibal, C., Tamai, T.K., Klotz, L., Cowen, S., Peyric, E., Reynoso, V.H., (...), Whitmore, D.
(2013) *Circadian Rhythms in Mexican Blind Cavefish Astyanax Mexicanus in the Lab and in the Field*, 4, p. 2769. Cited 2 times.

4 Priyadarshana, T., Asaeda, T., Manatunge, J.

Hunger-induced foraging behavior of two cyprinid fish: Pseudorasbora parva and Rasbora daniconius

(2006) *Hydrobiologia*, 568 (1), pp. 341-352. Cited 13 times.
doi: 10.1007/s10750-006-0201-5

View at Publisher

5 Chapman, B.B., Morrell, L.J., Krause, J.

Unpredictability in food supply during early life influences boldness in fish

(2010) *Behavioral Ecology*, 21 (3), pp. 501-506. Cited 49 times.
doi: 10.1093/beheco/arq003

View at Publisher

6 Sanchez-Vázquez, F.J., Madrid, J.A., Zamora, S.

Circadian Rhythms of Feeding Activity in Sea Bass, Dicentrarchus labrax L.: Dual Phasing Capacity of Diel Demand-Feeding Pattern

(1995) *Journal of Biological Rhythms*, 10 (3), pp. 256-266. Cited 112 times.
doi: 10.1177/074873049501000308

View at Publisher

7 Biswas, G., Thirunavukkarasu, A.R., Sundaray, J.K., Kailasam, M.

Optimization of feeding frequency of Asian seabass (Lates calcarifer) fry reared in net cages under brackishwater environment

(2010) *Aquaculture*, 305 (1-4), pp. 26-31. Cited 31 times.
doi: 10.1016/j.aquaculture.2010.04.002

View at Publisher

8 Harpaz, S., Hakim, Y., Barki, A., Karplus, I., Slosman, T., Eroldogan, O.T.

Effects of different feeding levels during day and/or night on growth and brush-border enzyme activity in juvenile Lates calcarifer reared in freshwater re-circulating tanks

(2005) *Aquaculture*, 248 (1-4), pp. 325-335. Cited 30 times.
doi: 10.1016/j.aquaculture.2005.04.033

View at Publisher

9 Ariyomo, T.O., Watt, P.J.

Effect of hunger level and time of day on boldness and aggression in the zebrafish Danio rerio

(2015) *Journal of Fish Biology*, 86 (6), pp. 1852-1859. Cited 12 times.
doi: 10.1111/jfb.12674

View at Publisher

10 Josep, A.
Repeatability of circadian behavioural variation revealed in free-ranging marine fish
(2017) *Royal Society Publishing*, 4, p. 11. Cited 2 times.
M M-B a A C-C

11 Cortes, C., Vapnik, V.

Support-Vector Networks

(1995) *Machine Learning*, 20 (3), pp. 273-297. Cited 17740 times.
doi: 10.1023/A:1022627411411

View at Publisher

12 Dutta, M.K., Sengar, N., Kamble, N., Banerjee, K., Minhas, N., Sarkar, B.

Image processing based technique for classification of fish quality after cypermethrine exposure

(2016) *LWT - Food Science and Technology*, 68, pp. 408-417. Cited 8 times.
http://www.elsevier.com/inca/publications/store/6/2/2/9/1/0/index.htt
doi: 10.1016/j.lwt.2015.11.059

View at Publisher

13 Cubitt, K.F., Williams, H.T., Rowsell, D., McFarlane, W.J., Gosine, R.G., Butterworth, K.G., McKinley, R.S.

Development of an intelligent reasoning system to distinguish hunger states in Rainbow trout (Oncorhynchus mykiss)

(2008) *Computers and Electronics in Agriculture*, 62 (1), pp. 29-34. Cited 8 times.
doi: 10.1016/j.compag.2007.08.010

View at Publisher

14 Taha, Z., Musa, R.M., P.P. Abdul Majeed, A., Alim, M.M., Abdullah, M.R.

The identification of high potential archers based on fitness and motor ability variables: A Support Vector Machine approach

(2018) *Human Movement Science*, 57, pp. 184-193. Cited 6 times.
http://www.elsevier.com/locate/humov
doi: 10.1016/j.humov.2017.12.008

View at Publisher

< Back to results | 1 of 2 Next >

^ Top of page